

Claims

What is claimed is:

1. A hydraulic system, comprising:
  - a tank adapted to store a supply of fluid;
  - a source of pressurized fluid in fluid communication with the tank;
  - a first hydraulic actuator in fluid communication with the source of pressurized fluid;
  - a second hydraulic actuator in fluid communication with the source of pressurized fluid;
  - a first fluid return line adapted to direct a return flow of fluid from the first hydraulic actuator to the tank;
  - a second fluid return line adapted to direct a return flow of fluid from the second hydraulic actuator to the tank; and
  - a pressure control device disposed in the second fluid return line and operable to selectively adjust a magnitude of fluid pressure in the second fluid return line.
2. The hydraulic system of claim 1, wherein the first hydraulic actuator is a hydraulic cylinder and the second hydraulic actuator is a hydraulic motor.
3. The system of claim 2, further including:
  - a first set of independent metering valves adapted to control a flow of fluid between the source of pressurized fluid and the hydraulic cylinder and to control a flow of fluid from the hydraulic cylinder to the first fluid return line;
  - and

a second set of independent metering valves adapted to control a flow of fluid between the source of pressurized fluid and the hydraulic motor and to control a flow of fluid from the hydraulic motor to the second fluid return line.

4. The hydraulic system of claim 2, further including a plurality of hydraulic cylinders and a plurality of hydraulic motors.

5. The system of claim 1, further including a controller adapted to adjust the pressure control device to thereby adjust the magnitude of fluid pressure in the second fluid return line.

6. The system of claim 5, wherein the pressure control device includes a check valve disposed in the second fluid return line and a proportional reducing valve adapted to control the magnitude of fluid pressure in the second fluid return line.

7. The system of claim 1, further including a second source of pressurized fluid in fluid connection with the pressure control device.

8. The system of claim 1, further including a by-pass line connecting the source of pressurized fluid with the second return line to direct a flow of fluid from the source of pressurized fluid to the pressure control device.

9. The system of claim 8, further including a by-pass valve disposed in the by-pass line and operable to control a rate at which the flow of fluid flows through the by-pass line.

10. The system of claim 1, wherein the source of pressurized fluid includes a first pump and a second pump.

11. A method of controlling a hydraulic system on a work machine;

supplying pressurized fluid to a first hydraulic actuator and to a second hydraulic actuator;

directing a return flow of fluid from the first hydraulic actuator through a first return line to a tank;

directing a return flow of fluid from the second hydraulic actuator through a second return line to the tank; and

adjusting a pressure control device disposed in the second return line to selectively adjust a magnitude of fluid pressure in the second return line.

12. The method of claim 11, wherein the second hydraulic actuator is a hydraulic motor and further including controlling a flow of fluid to the hydraulic motor to thereby control the motion of a swing assembly.

13. The method of claim 12, further including adjusting the pressure control device in response to a change in the operation of the swing assembly.

14. The method of claim 13, further including adjusting the pressure control device in response to a change in an operation of a second hydraulic motor associated with a first traction device and to a change in an operation of a third hydraulic motor associated with a second traction device.

15. The method of claim 12, further including increasing the magnitude of the fluid pressure in the second return line in response to a decrease in the rate of fluid flow through the second return line.

16. The method of claim 15, further including decreasing the magnitude of the fluid pressure in the second return line in response to an increase in the rate of fluid flow through the second return line.

17. A work machine, comprising:  
a work implement linkage;

at least one hydraulic cylinder connected to the work implement linkage and adapted to move the work implement linkage;

a swing assembly mounting the work implement linkage;

a hydraulic motor connected to the swing assembly and adapted to rotate the swing assembly to thereby rotate the work implement linkage;

a tank adapted to store a supply of fluid;

a source of pressurized fluid in fluid communication with the tank and adapted to supply pressurized fluid to the at least one hydraulic cylinder and to the hydraulic motor;

a first fluid return line adapted to direct a return flow of fluid from the hydraulic cylinder to the tank;

a second fluid return line adapted to direct a return flow of fluid from the hydraulic motor to the tank; and

a pressure control device disposed in the second fluid return line and operable to selectively adjust a magnitude of fluid pressure in the second fluid return line.

18. The work machine of claim 17, further including:

a first set of independent metering valves adapted to control a flow of fluid between the source of pressurized and the hydraulic cylinder and to control a flow of fluid from the hydraulic cylinder to the first fluid return line; and

a second set of independent metering valves adapted to control a flow of fluid between the source of pressurized and the hydraulic motor and to control a flow of fluid from the hydraulic motor to the second fluid return line.

19. The work machine of claim 17, further including:

a plurality of hydraulic cylinders associated with the work implement linkage;

a traction device having a first track and a second track;

a second hydraulic motor associated with the first track; and  
a third hydraulic motor associated with the second track.

20. The work machine of claim 19, further including a controller adapted to adjust the pressure control device to thereby adjust the magnitude of fluid pressure in the second fluid return line based on the operation of at least one of the swing assembly and the traction device.

21. The work machine of claim 17, wherein the pressure control device includes a check valve disposed in the second fluid return line and a proportional reducing valve adapted to control the magnitude of fluid pressure in the second fluid return line.

22. The work machine of claim 19, further including a second source of pressurized fluid in fluid connection with the pressure control device.

23. The work machine of claim 17, further including:  
a by-pass line connecting the source of pressurized fluid with the second return line to direct a flow of fluid from the source of pressurized fluid to the pressure control device; and

a by-pass valve disposed in the by-pass line and operable to control a rate at which the flow of fluid flows through the by-pass line.

24. A hydraulic system, comprising:  
a tank adapted to store a supply of fluid;  
a source of pressurized fluid in fluid communication with the tank;  
a first hydraulic actuator in fluid communication with the source of pressurized fluid;  
a second hydraulic actuator in fluid communication with the source of pressurized fluid;  
a first fluid return line adapted to direct a return flow of fluid from the first hydraulic actuator to the tank;

a second fluid return line adapted to direct a return flow of fluid from the second hydraulic actuator to the tank; and

a pressure control means for selectively adjusting a magnitude of fluid pressure in the second fluid return line.